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A study was conducted to see if children in a 6-week Head Start program in Canton, Ohio would make greater cognitive gains in an academically structured curriculum than in a less structured one. With the exception of the educational program, all other aspects of the traditional Head Start program remained the same for all children. Inservice training programs for teachers and aides were conducted and parent-teacher meetings were encouraged. Fifteen children in each of eight Bereiter-Engelmann program centers and 15 in each of eight control centers were pretested and posttested on the Caldwell Preschool Inventory and the Engelmann Concept Inventory. Results of statistical analysis of the data by matched pairs showed that, over a short term, children in the structured curriculum made greater gains than those in the unstructured program. A followup study was not attempted so that it was not learned whether gains would be sustained after a year or more in school. Other study findings suggest that elementary school teachers, rather than those trained for kindergarten, most easily adapt to structured preschool programs and that neighborhood women may profitably be recruited and trained to be teacher aides. Further investigation into the nature of the optimal type of Head Start curriculum is urged. (MS)

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AN EVALUATION OF A SIX-WEEK HEADSTART PROGRAM USING AN ACADEMICALLY ORIENTED CURRICULUM: CANTON, 1967

BY

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Ontario Institute for Studies in Education

Toronto, Ontario

April, 1968

The study was sponsored by the Canton Public Schools and the Bereiter-Engelmann Program at the University of Illinois and was conducted with funds provided by the Office of Economic Opportunity and the Carnegie Foundation. The study was submitted in partial fulfillment of the requirements for the degree of Master of Science at the University of Illinois. Permission to publish the results of the study must be obtained from the author.

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I INTRODUCTION

Cultural Deprivation is a phenomenon that North America has just begun to recognize as a problem. The problem is not that poverty exists. The problem is that for many it appears to be becoming a way of life. Education has been looked to for a solution to the problem of cultural deprivation and in 1965 the Federal Government initiated an educational program which was intended to prepare the culturally deprived child to begin school. Project Headstart has received a great deal of public attention, but little has been done to determine whether the program is accomplishing its primary goal and whether that goal could be better accomplished. The present study is not an attempt to evaluate Headstart, so much as an attempt to determine what can be accomplished in a summer Headstart program. The study undertaken in Canton, Ohio, in the summer of 1967, is an attempt to find out whether in a six week Headstart program, children following an academically oriented curriculum could make significant cognitive gains over children following a less structured curriculum. In the experimental centers, only the educational program differed from the recommendations for Headstart. The children in both experimental and control schools received the benefit of health, social, psychological, nutritional, parent programs and field trips.

II REVIEW OF THE LITERATURE

A. Cultural Deprivation: The Problem

It has been demonstrated through surveys and studies that the academic performance of a child is related to his socioeconomic background. One survey has indicated that in the South by third grade over 50% of nonwhite children are one or more grades behind the modal grade; and at age fifteen, two-thirds of the nonwhites still enrolled are behind the modal grade (Fein, 1967). Moreover, the problem is not confined to the Negro American. In studies comparing the factors of race and socio-economic status, the environmental factor rather than the factor of heredity emerged as the chief predictor of a low level of academic performance (Deutsch, 1964; 1965). The white child from a low-income home faces more or less the same likelihood of failure in school as the nonwhite child. Not only does the lower-class child stand a better chance of failure, but often he does not learn at a 'normal rate' during his years at school. As Kirk (1966) has pointed out, there is a common tendency for the cognitive performance of the child from a lower socioeconomic background on standardized intelligence tests to decrease rather than increase in the course of the educational process. To remedy the educational disadvantage of the culturally deprived child, a variety of educational solutions have been proposed.

B. Project Headstart

In the summer of 1965 the Federal Government initiated Project Headstart, a preschool program for disadvantaged children. It was believed

that by bringing children from low-income homes to school for 6 to 8 weeks in the summer or for a full year before they began the regular school session (in kindergarten or Grade 1), they would become adjusted to school and would, therefore, be better prepared to learn and to compete with their more advantaged classmates when the regular session began. As of March 1967, 1.3 million children have been enrolled in Headstart programs in 2400 communities - 561,000 in the summer of 1965, 575,000 in the summer of 1966, and 171,000 in full year programs (Brazziel, 1967).

The Headstart Program of child development has six major aspects: an educational program, health services, social services, psychological services, nutrition and parent programs (U.S.O.E.O., 1965). While it is impossible to make any universally valid statement about the educational curriculum employed in Headstart, since it varies from location to location and from teacher to teacher, the curriculum in most centers emphasizes social objectives and the broadening of experience with the world. Development of vocabulary, verbal fluency and spontaneity of expression through unstructured teaching is also recognized as important.

The most significant evaluation of Project Headstart to date is that of Max Wolff and Annie Stein (1967) titled 'Six Months Later', a study comparing Headstart and non-Headstart children after six months of kindergarten in New York Schools. These investigators found that Headstart children tended to be ranked higher in their kindergarten classes in greater proportions than children who had not had Headstart, and they appeared with less frequency in the bottom three deciles of the class than non-Headstart children. However, in the mixed school, where children from low-income homes were expected to compete with children from a

middle-income housing project, Headstart children appeared with less frequency than non-Headstart children in the upper ranks and with greater frequency than non-Headstart children in the lower ranks. Although 23% of the parents sought specific educational goals for their children, only two of the teachers listed the actual learning of concepts as being of first importance, and in some cases concept learning was not listed as an aim by the teacher. Of the fourteen teachers interviewed, nine felt that any initial advantage in social adjustment in school evidenced by Headstart children had disappeared after the first few months of kindergarten. Of the four teachers who thought the advantage had persisted, three had been closely associated with the Headstart program. A more objective rating indicated that 91% of the Headstart children adjusted in a short time as against 69% of the non-Headstart children. By the end of November, most of the children both Headstart and non-Headstart were fully adjusted to school routines and 'any advantage held by Headstart children had vanished'. In performance on the Pre-School Inventory 6 to 8 months after the summer Headstart program, there was no significant difference between the scores of Headstart children and their classmates in kindergarten who did not have Headstart. However, Headstart children's mean ratings in the minority-group schools (Negro and Puerto Rican) were slightly better than those of non-Headstart children. In the mixed school the performance of the non-Headstart children was slightly better. The conclusions that can be drawn from the Wolff-Stein study are that in the Headstart centers investigated the children made social gains but that these disappeared a few months after the beginning of the regular school session and that in cognitive ability as measured by the Pre-School Inventory, the children made slight gains but not enough to allow them

to compete with children from middle-income homes. The study leaves open the question whether a program that emphasizes cognitive goals rather than social objectives will better prepare the disadvantaged child to compete in an academic environment.

C. The Nature of the Deprivation

Before a remedial program can be developed for the culturally deprived child, the nature of his deprivation must be diagnosed. One of the theories that has taken hold is the interpretation of cultural deprivation as sensory deprivation. The child is considered deprived because he has failed to receive the sensory stimulation necessary for adequate cognitive development. According to this theory, a compensatory program must concentrate on the development of perceptual ability and sensori-motor skills. Experiments with rats and chimpanzees have demonstrated that a certain amount of patterned light is necessary for the development of sight and that animals raised in darkness or unpatterned light fail to develop adequate visual systems (Riesen, 1960). Dennis (1960) reported on orphans in Tehran raised in a blank atmosphere without handling or fondling, many of whom could not sit at age two or walk or talk at age four. It has been proposed that retardation in the development of the culturally deprived child is due to the same factors. However, there is no evidence that the culturally deprived child fails to receive adequate stimulation for normal learning. As Hunt (1964a) has pointed out, during the first year the child in a lower-class home will generally be exposed to more sense stimuli than the child in a higher-class home because of the usually over-crowded living conditions. Hunt maintains that the child's sensory deprivation begins instead when the child is old enough to play outside, that is, in his third and fourth years. However, it has not been

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demonstrated that the middle-class backyard is a source of greater sensory stimulation than an inner-city street.

The more theoretical issue is whether concrete pre-verbal experience is the crucial factor in the development of academic aptitude that Hunt (1964b) following Piaget would hold it to be. Bereiter (1965) has compared the intellectual and academic performance of blind and deaf children, the blind representing a group who had verbal experience and severely limited concrete experience, and the deaf, a group who has no verbal experience but full concrete experience. Blind children show little or no academic deficiency, whereas deaf children are about 10 points below normal in IQ. Deaf children are also retarded from two to five years throughout school, and even with a longer period of schooling do not usually progress beyond the seventh grade. Nor does the socioeconomic level of the home seem to affect the amount of deprivation. There appear to be no differences when deaf children from lower-class homes are compared to children from upper-class homes, although the upper-class child presumably has a background more rich in concrete experience. From this study Bereiter concludes that academic achievement is affected more by a lack of verbal experience than of concrete experience.

Other studies have demonstrated the lack of verbal experience in the lower-class home. Strodtbeck (1965) has pointed out that the power structure of the middle-class home lends itself to a teaching situation, whereas the structure of the lower-class home does not. It has also been demonstrated that lower-class mothers use more imperatives in the adult-child exchange (Strodtbeck, 1964) and that when faced with the problem of teaching their child a particular task, they flounder as if this were a completely new experience for them (Hess, 1965). Loban (1963)

has compared the spontaneous speech of high language ability and low language ability children on three criteria, syntax, function of communication, and oral language style and has demonstrated the striking differences in the verbal ability of elementary school children. Bernstein (1961; 1964) through analyses of lower-class speech has also pointed out the inadequacy of the 'restricted code' for expressing the abstract concepts in which the school deals.

D. Compensatory Preschool Programs

The research in compensatory education has been concentrated in the preschool for theoretical and practical reasons. In order to justify early intervention Bloom (1964) has been interpreted as stating that the cognitive ability of the child is fifty percent developed by the time he is four years old. Deutsch (1964) and Kirk (1966) have noted what has been termed 'the cumulative deficit', the tendency for the culturally deprived child to fall farther and farther behind in intellectual and academic performance because of his intial (sic) deficiency in learning. The more practical problem of preparing culturally deprived children to compete in integrated classrooms and the public interest generated in the area with the initiation of Headstart have been added incentives for the development of experimental preschool programs.

Programs that have met with the greatest measure of success are those which have stressed language and cognitive goals.

Weikart (1964) has reported a program which combines a permissive, teacher-structured morning program emphasizing verbal stimulation, interaction and dramatic play with weekly home visits in which the mother is encouraged to participate in the instruction of her child. Two waves of children have been reported. The first wave made some

significant gains over controls on the Stanford-Binet in the preschool. However, the difference between experimental and control groups on the Binet was not statistically significant after one year in kindergarten. The second wave also made a significant gain in the preschool but did not differ from its control in IQ by the end of kindergarten. However, the difference on the Peabody Picture Vocabulary Test and two subscales of the Illinois Test of Psycholinguistic Abilities was significant.

Gray and Klaus (1965) and Gray (1966) have reported that in a program to develop language through reading to the children carried out in an intensive summer program and weekly home visits during the year, children in the experimental group showed significant gains from pretest to posttest on the Peabody Picture Vocabulary Test, the Stanford-Binet, and the Illinois Test of Psycholinguistic Abilities, whereas control children showed losses.

In an interim report on the use of a curriculum based on the Peabody Language Development Kit (Dunn, 1963) which emphasizes the discriminative selection of adjectives and adverbs, the development of syntax, lengthening sentences and increasing complexity and the qualifying of statements by conjunctions and subordinate clauses, Stearns (1966) reported that children improved on subtests of the ITPA and Stanford-Binet.

In the studies reviewed thus far, children in the control group received no treatment at all. However, as both the Wolff-Stein and Weikart studies demonstrate, children in an experimental treatment can make significant gains over controls who remain at home, but once the control children begin school the initial gains of the experimental group are lost. A more valid approach to evaluating a compensatory preschool program would appear to lie in comparing the gains made by children in two different preschool treatments rather than in having controls who receive no treatment at all. The evaluation can be extended by comparing the later academic success of the children in the two treatments.

In the program initiated by Bereiter and Engelmann (1966) a school language is taught directly to the children in highly-structured, small-group teaching. The children in their program receive equal amounts of instruction (20 minutes a day) in language, reading and arithmetic. All three curricula were approached through an analysis of the task and programing of the components of the task. The reading curriculum takes a phonic approach. The arithmetic curriculum stresses traditional arithmetic skills. Three groups have completed the preschool program and two groups have completed the preschool and kindergarten programs. The results for the three groups on the Stanford-Binet and on the reading, arithmetic and spelling subtests of the Wide Range Achievement are reported in Table 1.

Insert Table 1

All three groups made significant gains on the Stanford-Binet in the preschool. The first group maintained the initial gain in the kindergarten year and the second group improved upon it.

The Bereiter-Engelmann curriculum was also used in a study conducted by Reidford and Berzonsky (1967a). In an eight month preschool program they achieved gains of 6.4 points on the Stanford-Binet. The ITPA was administered in the posttesting but not in the pretesting.

In the first year of the Bereiter-Engelmann Program and in the Reidford-Berzonsky study, no control groups were used. However, the children in the second and third groups of the Bereiter-Engelmann Program have been part of a larger study at the University of Illinois involving five programs (Karnes, 1968):

1. A traditional nursery school emphasizing the acquisition of social skills and informal learning

TABLE 1

Results of Three Groups of Children in the Bereiter-Engelmann Program, University of Illinois

Groups	Stanford Binet IQ	Wide Range Achievement (Grade Level) Reading	Arithmetic	Spelling
I (N=14)				
Fall 1964	95			
Summer 1965 (after preschool)	102	1.0	1.9	.5
Spring 1966 (after kindergarten)	105	1.7	2.6	1.8
II (N=11)				
Fall 1965	96			
Spring 1966 (after preschool)	112	1.2	1.1	1.2
Spring 1967 (after kindergarten)	121	2.6	2.6	1.8
III (N=14)				
Fall 1966	91			
Spring 1967 (after preschool)	103	1.3	1.0	1.1

2. The Karnes Program for the amelioration of learning deficits, stressing sensory motor manipulation, basic language processes and specific content in mathematics, social studies and science
3. The Bereiter-Engelmann Program
4. A Montessori Program employing a qualified Montessori teacher and equipped with Montessori materials
5. A Community Integrated Program in which a traditional nursery school for middle-class children conducted by professional teachers was attended by two or three disadvantaged children.

The children were pretested and posttested at the end of the preschool year on the Stanford-Binet and ITPA. On the Stanford-Binet there were no significant differences between groups on the pretest. On the posttest the Traditional, Montessori and Community Integrated groups made no significant gains. The Karnes and Bereiter-Engelmann groups were significantly higher than the other three groups and there was no significant difference between them. On the ITPA the Traditional and Karnes groups were significantly higher on the pretest. All five groups made significant gains on the posttest. The Traditional, Karnes and Bereiter-Engelmann groups were significantly higher than the Montessori and Community Integrated groups. However, there were no significant differences between the Traditional, Karnes and Bereiter-Engelmann groups.

In the second year the children from three of the five groups were enrolled in different programs. The Traditional group attended public school kindergarten. The Karnes group attended public school kindergarten in the morning and in the afternoon received one hour of instruction in language arts and arithmetic. The Bereiter-Engelmann children did not attend public school kindergarten but continued in a half day academic program.

The children were pretested and posttested on the Stanford-Binet, ITPA and the Metropolitan Readiness Test. On the Stanford-Binet the Traditional group lost the gain it had made in preschool so that the IQ after kindergarten was not significantly better than the IQ before the children entered preschool. The children in the Karnes group made no gains in the second year of the program. However, the gain made in the first year was maintained. The Bereiter-Engelmann group made significant gains over the scores at the end of the preschool year. On the ITPA all three groups made significant gains in the second year. The traditional and Karnes groups were not significantly different from one another. However, the Bereiter-Engelmann group was significantly higher than the other two groups. On the Metropolitan Readiness Test all three groups made significant gains.

Commenting on the results of the preschool programs, Karnes concludes that the two structured programs, Bereiter-Engelmann and Karnes, enhanced the intellectual functioning of disadvantaged children significantly more than did the other three programs. The gains of the subjects in the traditional program were in keeping with the gains reported in other preschool studies. The study found little support for integrating disadvantaged children into middle-class nursery schools as far as intellectual acceleration is concerned, and indicated that the Montessori program had little to offer the disadvantaged child in his intellectual functioning. Summarizing the two-year study she states that the gains made during a year of traditional nursery school experience are not maintained without further special intervention. A half-day special program seems to result in increased acceleration of both intellectual functioning and language development, as indicated by the results of the

Bereiter-Engelmann Program. A dual kindergarten where subjects attend the public school kindergarten and are given supportive training for one hour a day enables children to maintain their IQ gains and to make progress in language development.

DiLorenzo (1968) has combined two approaches. Children in prekindergarten programs have been compared with home controls to determine the value of prekindergarten experience in the manner of Weikart and Gray-Klaus. However, the children in four different experimental treatments have also been compared to evaluate the compensatory curricula to which they have been exposed. The study took place in eight districts in New York State. In five districts the curriculum was that of the traditional nursery school. In one district the children were given individual work with reading readiness materials and then went on to preprimers and primers when they were ready. In another district the children had brief but regular exposure to the Edison Responsive Environment (ERE) Machine. In another district half of the children followed the Bereiter-Engelmann Program. This last treatment was begun in the second year of a two year study. The children were pretested and posttested on the Stanford-Binet, ITPA and PPVT. DiLorenzo makes the general conclusions that:

1. The prekindergarten experience was beneficial for the disadvantaged as indicated by significant differences between experimental and control children on the Stanford-Binet, ITPA and PPVT.

2. The most effective prekindergarten programs were those with the most specific and structured cognitive activities. This is demonstrated by the Schenectady program (reading readiness) which produced the greatest number of significant differences in the two-year period. It is substantiated by Cortland (Bereiter-Engelmann) which in its one year of participation produced the greatest gain and the largest differential between experimental and controls on the Stanford-Binet. The ERE machine was not effective, nor were those programs stressing the interaction of disadvantaged and nondisadvantaged children.

The DiLorenzo study leads to much the same conclusions as the Kernes' study. The integration of disadvantaged children into a middle-class preschool is not accompanied by cognitive gains. Exposed to a traditional nursery school program, children will make some gains over home controls. However, the most significant gains are achieved using a structured cognitively-oriented program.

Day (1968) has reported a 10 month study to compare the use of two curricula on the development of language as an intellectual tool. Forty-nine children were exposed to the Bereiter-Engelmann language program and thirty-eight children followed a unit-of-work approach in which receptive and expressive language was stressed. The children's language was measured by applying Siegel's system for organizing language grouping preference behavior to the children's description of a turtle, a cup and cars. Day found no significant differences between groups in total language production. The unit-of-work group used significantly more function or use words which were categorized as relational-contextual according to Siegel's system. There was no significant difference in the use of conceptual category words although children in the Bereiter-Engelmann program tended to use more. Descriptive part-whole words were analyzed in three ways. There was no significant difference between the groups in the use of nouns alone to describe objects. There was no significant difference between the groups in the use of attributive adjectives. However, the children in the Bereiter-Engelmann group did use significantly more color and form words to describe objects. Day concludes that the Bereiter-Engelmann group used attributes with greater clarity and specificity and notes that the programmed approach did not limit overall fluency. Children in the highly structured Bereiter-Engelmann program gave evidence of having transferred their language behavior from a teaching situation to an open-ended interview.

From the studies reviewed thus far it can be concluded that children in a long-term prekindergarten program do make significant cognitive gains over home controls; that children in a structured program with specific cognitive goals make significant gains over children in a less structured program; and that children who continue in an academic kindergarten make better gains than those who begin a public school kindergarten immediately after preschool. This research does contribute to an evaluation of long-term preschool programs. However, little work has been done to evaluate short-term programs such as summer Headstart. Only one study, by Reidford and Berzonsky (1967b), is relevant.

In the Reidford-Berzonsky study a random sample of forty-six children in an eight-week Headstart program using the Bereiter-Engelmann curriculum was compared with eighteen control children who received no preschool treatment. Children were pretested on the PPVT, and posttested on the PPVT and two subtests of the Illinois Test of Psycholinguistic Abilities six to seven weeks after the conclusion of the summer program and four to five weeks after the children had begun kindergarten. No significant differences were found between the groups on the posttests.

Reidford and Berzonsky recognize the limitations of their study. Only one day of teacher-training was provided and this was not considered sufficient by the teachers involved. The control group received no treatment. The posttests were not administered until after the children had been in kindergarten for four or five weeks. The study is, therefore, not a measure of the value of an academically oriented curriculum so much as the value of an eight week Headstart program in general. Reidford Berzonsky conclude:

> This study tends to indicate that it is not feasible to employ an intensive academic curriculum such as the Bereiter-Engelmann program, in an eight-week summer preschool program. First of all, this program requires teachers experienced with this rigid stereotyped procedure. Also eight weeks appears to be insufficient time to bring about significant gains in the academic functioning of a disadvantaged child.

The Wolff-Stein study has called into question the effectiveness of Headstart in accomplishing its primary goal, the preparing of children from low-income homes to succeed in school. Weikart and Grayand Klaus have demonstrated that children in a long-term program make greater cognitive gains than children who receive no preschool. Karnes, DiLorenzo and Day have demonstrated that children in an academically oriented program make significantly greater gains in cognitive and language development than children in a traditional nursery school or less structured language program. Reidford and Berzonsky have called into question the possibility of achieving significant cognitive gains in a short-term program.

The present study is an attempt to implement an academically oriented curriculum in a six week Headstart program and to compare the gains in cognitive ability made by the children in a highly structured language program with those made by children in less structured programs. In eight experimental centers a curriculum based on the language and arithmetic programs developed by Bereiter and Engelmann was used. The teachers in the experimental program received one week of pretraining in the academic curriculum. In nine control schools, as is common in Headstart centers, the teacher was left free to develop her own curriculum under the supervision of the Director of Headstart. Cognitive gains from pretest to posttest were measured by the Pre-School Inventory (Caldwell, 1967) and the Concept Inventory (Engelmann, 1967). In all respects both the experimental and control programs fulfilled the pre-requisites established by Headstart. Full health services, social and

psychological services and nutrition programs were provided. An academically oriented parent program was developed in two of the experimental centers and in the other centers weekly parent meetings were held. Children in both programs took part in field trips.

III PROCEDURE

A. Sponsors and Staff

Bereiter and Engelmann were asked by the Superintendent of Schools for Canton, Ohio, to conduct a study comparing two different teaching methods in the summer Headstart Program in Canton. Responsibility for the study was shared by the Canton Public Schools and the Bereiter-Engelmann Program at the University of Illinois. The teachers and administrative staff employed were members of the Canton Public Schools. Neighborhood women served as aides and cooks. Additional staff consisted of a Visiting Consultant who came from Illinois to conduct a pre-service teacher-training program for the teachers in the experimental program for one week before the Headstart Program began and an Experimental Project Supervisor from the University of Illinois who supervised the testing in all the schools and consulted with the teachers of the experimental program during the seven week period of teacher-training and teaching.

B. Subjects

The subjects in the study consisted of all the children in the summer Headstart program in Canton, Ohio. Seventeen centers, each with approximately fifteen children were involved. Approximately half the total population was Negro. Children were selected for the program by the principals of the schools in which the summer program took place according to the socioeconomic standards recommended for Headstart.

C. Basic Design

The study employed a matched pairs design using groups rather than individuals as the unit for pairing. Of the 17 Headstart centers, 8 were designated as experimental. A school was considered experimental if the teacher assigned to teach in the summer program in that school volunteered for the experimental program. The remaining 9 schools were designated as control. The 8 experimental schools were then matched according to socioeconomic level with 8 schools in the control group. This matching was done by members of the Canton Public Schools before the pretests were administered. The control school that was left unmatched was omitted from the results based on the pairs of schools.

D. Testing

Subjects in both the experimental and control schools were pretested and posttested on two tests, the Pre-School Inventory developed by Caldwell (1967) and recommended by Headstart, and the Concept Inventory developed by Engelmann (1967). The pretest was given during the first three days of the summer program and the posttests during the last three days. For the testing seventeen testers were hired by the Canton Public Schools and assigned one to each center. The testers were all kindergarten or primary teachers. The testers were not informed of whether they were testing in an experimental or control school. However, by the end of the program, most testers were aware of which schools were experimental and which control.

It was intended that the same tester would administer both the pretest and posttest to the same group of children. However, six of the original seventeen testers were not available for the posttest and new testers had to be obtained. In the results the pairs of schools where both testers remained constant are noted.

E. Teachers and Training

From the seventeen teachers selected to teach in the summer Headstart program, eight volunteered for the experimental program. The teachers in the experimental program had an average of 14.1 years of teaching experience ranging from 2.5 years to 33. Of the eight experimental teachers, all but one had taught at the elementary level and three were currently kindergarten teachers. In the control schools the teachers had an average of 14.8 years of experience ranging from 1 year to 44. Of the nine control teachers, all had had some experience teaching elementary grades and four were teaching kindergarten at the time of the experiment.

The teachers in the experimental schools attended a preservice training program 6 hours a day for 5 days. The aides attended the training session for 3 mornings. One morning was spent in a general meeting and the afternoon of the last day was spent in the schools preparing the classroom for the opening day. In the training program two groups of children were used so that the teachers had an opportunity to do some practice-teaching at two different levels, a beginning level and an advanced level. In addition to the practice-teaching, they received instruction in the language program: how to set up clear teaching demonstrations, how to group the children by ability and program the material for each group, how to develop a schedule which integrates all the activities into the overall purpose of teaching language, how to manage the classroom. The last day was spent preparing teaching materials. The aides received very brief instruction in the concepts and language patterns used in the program, in arithmetic, and in classroom management.

The teachers in the control schools, all of whom had taught Headstart before, received instructions from the Director of the Headstart Program in three half-day sessions.

During the six week period, the Experimental Project Supervisor visited each center about once a week and observed the teacher in the direct-teaching segments of the program. Some time was also spent with the aide during these visits, since the aides were teaching arithmetic. Once a week a meeting was held for the teachers in all the centers. After the general meeting the experimental teachers met with the Experimental Project Supervisor to discuss general problems and to exchange seat-work activities for the children.

At the end of the program the teachers in the experimental schools completed a questionnaire on their teaching background, and their evaluation of the teacher-training program and experimental curriculum. The teachers in the control schools completed a questionnaire on their teaching background and the curriculum they had used during the six-week program.

F. Duration of the Program

The Headstart Program began for all the children on June 19 and continued for six weeks, five days a week until July 28. During this time there were two holidays. In the control schools three mornings were given over to field trips, to a farm, to an amusement park and to the airport. The experimental schools took two of these trips, to the farm and to the amusement park. In the experimental program there were, therefore, 26 days of direct instruction.

G. Curriculum: Control Schools

The program in the control schools extended from 8:30 am to 12:30 pm, and included juice, rest, lunch and brushing teeth. The teachers were left free to develop their own curriculum. Since all had had experience teaching Headstart, all stated that they considered language development important. They encouraged the children to speak in sentences and emphasized work with colors, shapes and numbers. Music and stories were also a basic part of the curriculum. At the beginning of the program the teachers in the control schools were asked to adhere to the curriculum which they had originally planned, even if they learned about the subject matter being taught in the experimental schools. There was, however, no assurance that they did not adapt their program to a more academic curriculum during the course of the summer.

H. Curriculum: Experimental Schools

In the experimental program the following basic schedule was developed to be used in all the centers:

8:15- 8:45	Books. Toys.	
8:45- 8:50	Opening Ceremony	
8:50- 9:50	Language Instruction	- Teacher
	Seat Work	- Aide
	Indoor or Outdoor Play	- Volunteer (when available)
9:50-10:30	Bathroom	
	Juice and Crackers	
	Rest	
10:30-10:45	Arithmetic Instruction	- Teacher and Aide
10:45-11:45	Music	
	Art or Games	
	Story	
11:45-12:30	Bathroom	
	Lunch	
	Brushing Teeth	

The program began at 8:30 am and continued until 12:30 pm. When the children first arrived they were left free to choose a book or to play with toys in the toy corner. After the opening exercises, one hour was set aside for the direct-teaching of language. For this period the children were divided into three ability groups of five. Each group received instruction for 20 minutes. While one group was being instructed, the aide conducted seat-work activities with a second group. An attempt was made to co-ordinate seat-work with the language instruction. If the children had just been taught 'big' and 'not big', for instance, they would work at coloring or circling pictures of things that were big or not big. When they left for home, the children were given their seat-work and were encouraged to show this to their parents. The teachers developed their own seat-work activities and pooled these at the weekly teachers' meeting. While one group was in language class and another was doing seat-work, a third group was free either to play quietly in the toy corner or, if there was a volunteer, to recreate outside. In all but one school the direct-teaching took place in the classroom, so that the teacher could supervise all the activities while she was teaching language.

The language instruction was followed by a period of about forty minutes when the children went to the bathroom, had juice and crackers and in some schools had a brief rest period. The teachers and aides were encouraged to utilize this period for engaging the children in a more informal group conversation. During the rest period the teachers were asked to play records that were educational as well as entertaining.

After rest period the children attended a class in arithmetic for 20 minutes. For this instruction they were divided into two ability groupings. One of the groups was taught by the teacher, the other by the

aide. In most of the schools the aides taught the higher ability group and within six weeks covered counting by rote, counting objects, numeral recognition, addition and subtraction.

After the arithmetic class one hour was devoted to music, art or games and a story. The music the teachers were asked to use was from the Bereiter-Engelmann Program. However, some of the teachers had difficulty learning this new material without assistance and substituted more traditional nursery school songs. In the art activities and games they chose the teachers were encouraged to use information that the children had already learned in the language and arithmetic instruction. The teachers also received some direction in story-telling and in how to engage the children in a question-answer activity rather than reading the story directly. During either the story or arithmetic period, the teachers were asked to do some work on oral preparation for reading - oral bending and rhyming. However, since there was little time available for training them in these activities, there was a tendency for this activity to be omitted.

The day concluded with another break for bathroom, lunch and brushing teeth. During the lunch period the teacher and aide were again encouraged to engage the children in informal conversation.

I. Health, Psychological, Social Services and Nutrition Program

Before the summer program began, children in both the experimental and control schools received a physical examination, a dental examination and a speech evaluation. While the program was in session, with parental permission, children had a urine analysis, triple vaccine, Salk vaccine, small pox vaccine, Heaf test for tuberculosis and measles vaccine. Children who required special attention received dental care, and visual and hearing re-examinations.

At the request of the teacher some children were given a Stanford-Binet by a school psychologist to be used in deciding the child's placement in school.

A social worker and two aides were employed to arrange for speakers for parent meetings, to notify parents of appointments when there was no phone in the home and to visit homes in the case of prolonged or frequent absence from school.

As part of the nutrition program the children in both the experimental and control schools were served juice and cookies in the middle of the morning and lunch at noon.

J. Parent Program

Since Headstart prescribes a parent program during the summer session and since co-operation from the parents is obviously so necessary if the disadvantaged child is to compensate rapidly from his learning deficit, it was decided to incorporate an experimental parent program into the Headstart Program at two of the experimental schools.

In two schools eight of the parents were asked to attend a parent meeting once a week. The parents arrived at 12:45 after the children had finished their regular program. Babysitting service was provided for those who had other children. The parents first observed a 20 minute teaching demonstration using their own children and conducted by the Experimental Project Supervisor. The children, then, went outside with a Neighborhood Youth Corps Worker and the parents remained to discuss ways in which the school-learning could be reinforced and continued at home.

The first meeting consisted of a general discussion of the purpose of the project and the role of the parents in the summer program. At the following meetings the parents observed demonstrations of language, story-telling, arithmetic and oral preparation for reading. The final meeting was a demonstration of what the children had learned in six weeks in language and arithmetic.

In all the other experimental schools and all the control schools parent meetings took place about once a week. It was customary to invite a guest speaker who would speak briefly to the parents and then conduct a discussion. During the course of the six weeks, the Experimental Project Supervisor spoke to the parents in all the schools both experimental and control and explained to them the purpose of the study and the nature of the experimental curriculum.

IV STATISTICAL ANALYSIS AND RESULTS

The means of the paired schools on the Pre-School Inventory are presented in Table 2 and of the Concept Inventory in Table 3. The Pre-School Inventory is scored on the number of items correct, whereas the Concept Inventory is scored on the number of items incorrect.

The pretest means of the matched pairs of schools were compared using a t-test and a Pearson product-moment correlation. A t-test was applied to the differences between the pretest means of the matched experimental and control schools on the Pre-School Inventory. The results were significant at the .05 level ($t=2.5$, $df=7$). A Pearson product-moment correlation applied to the pretest means of the matched experimental and control schools on the Pre-School Inventory resulted in an r of .07 ($df=7$). This is not significant. A t-test was also applied to the difference between the pretest means of the matched experimental and control schools on the Concept Inventory. The results approached significance at the .10 level ($t=1.57$, $df=7$). A Pearson product-moment correlation applied to the pretest means of the matched experimental and control schools resulted in an r of .4. This is also not significant. These results indicate that the pairing of the schools which was done before the testing on judged socioeconomic equivalence, resulted in paired groups that were similar to one another with respect to attributes measured by the Concept Inventory, but not on attributes measured by the Pre-School Inventory. It will be recalled that designation of schools as experimental and control groups was not random. Accordingly, pretest differences between experimental and control groups cannot be attributed *a priori* to chance.

The mean gain of each matched experimental and control school from pretest to posttest was obtained and is reported for the Pre-School Inventory in Table 2 and for the Concept Inventory in Table 3. The mean difference in gain was obtained by subtracting the mean gain of the control

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Insert Table 2 and Table 3

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school from the mean gain of its matched experimental school. The mean differences in gain between each pair of experimental and control schools are reported in Table 2 for the Pre-School Inventory and in Table 3 for the Concept Inventory. A t-test was applied to the mean differences in gain between the experimental schools and their matched controls. On the Pre-School Inventory the result was not significant but approached significance at the .10 level ($t=1.53$, $df=7$). On the Concept Inventory the result was significant beyond the .01 level ($t=3.93$, $df=7$).

Since the correlational and t-test statistics applied to the pretest results indicated that the experimental and control schools were not well matched initially, at least on attributes measured by the Pre-School Inventory, it was decided to carry out a further analysis in which the pairing of the groups is ignored and the individual child rather than the class is used as the unit of sampling. For this purpose a ranking statistic was employed. The children in the unmatched control school were also included.

In order to establish the ranks, the control children were ranked on both the pretest and posttest. The children in the experimental schools were then placed in the ranks established by the controls. The gains or losses in rank of the children in the experimental schools between pretest and posttest were noted. The Wilcoxen Test for Two Matched Samples was applied to these results for both the Pre-School Inventory and the

Concept Inventory. On the Pre-School Inventory the results were significant at the .001 level on a two-tailed test ($z=3.34$, $N_x=103$, $N_c=101$). On the Concept Inventory the results were significant beyond the .02 level on a two-tailed test ($z=2.26$, $N_x=107$, $N_c=103$).

TABLE 2

Means of Paired Schools on the Pre-School Inventory - Pretest, Posttest, Gains and Differences in Gain

Schools Paired Acc. to Socio-Economic Level	Pretest		Posttest		Mean Gains		Mean Difference in Gain
	Experimental	Control	Experimental	Control	Experimental	Control	
I	48.2	48.6	54.9	55.1	7.091	6.455	.636
II*	42.5	46.7	53.6	56.9	10.571	10.111	.460
III*	49.5	64.3	61.7	67.0	16.0	2.667	13.333
IV	44.6	55.0	60.6	60.8	16.0	4.714	11.286
V	49.8	49.2	54.9	64.8	5.083	15.545	-10.462
VI*	46.5	54.7	59.7	60.5	13.182	5.833	7.349
VII*	43.6	59.5	55.5	65.1	13.133	6.400	6.733
VIII	55.7	50.3	58.9	50.4	3.190	.077	3.013
Mean of School Means	47.5	53.5	57.5	60.0	10.531	6.475	4.044
Unmatched	-	59.5	-	67.3		7.800	

*Pairs of schools where both testers remained constant

TABLE 3

Means of Paired Schools on the Concept Inventory+ - Pretest, Posttest, Gains and Differences in Gain

Schools Paired Acc. to Socio-Economic Level	Pretest		Posttest		Mean Gains		Mean Difference in Gain
	Experimental	Control	Experimental	Control	Experimental	Control	
I	45.5	49.9	31.5	37.1	14.091	12.818	1.273
II*	52.2	52.5	33.2	45.3	18.571	6.500	12.071
III*	41.5	22.7	31.1	18.3	10.357	4.583	5.774
IV	50.4	34.5	34.8	25.9	15.615	8.583	7.032
V	44.7	43.1	32.0	36.6	12.692	6.462	6.230
VI*	38.0	37.1	27.0	26.5	11.000	10.692	.308
VII*	47.1	32.3	43.4	30.7	3.733	1.100	2.633
VIII	29.1	33.7	28.6	41.9	.563	-8.231	8.794
Mean of School Means	43.6	38.2	32.7	32.8	10.828	5.313	5.514
Unmatched	-	36.4	-	15.3		21.1	

* Pairs of schools where both testers remained constant

+ Scored by the number of items incorrect

V DISCUSSION

A. Results

On the Pre-School Inventory all but one of the schools had a mean gain from pretest to posttest that was higher than the mean gain of its paired control school. In the pair of schools (pair V) where the mean gain of the control school was higher than the mean gain of the experimental school, there was a change of testers from pretest to posttest in the experimental school. The fact that the mean gain in the control school of pair V was 9 points above the mean of the mean gains of the control schools and almost 5 points above the next highest mean gain, is cause for doubting the validity of the testing in the control school also. However, while it is possible to question the accuracy of the testing in both the experimental and control schools of pair V, there is no valid reason for excluding that pair from the final results. The fact that the schools were not well matched on the pretests of the Pre-School Inventory and the difference in mean gains between the experimental and control schools of pair V account for the failure to reach a level of significance when the differences between the mean gains of the paired experimental and control schools were compared.

On the Concept Inventory the mean gains of the experimental schools from pretest to posttest were all higher than the mean gains of their paired control schools. When the differences between the mean gains of the paired schools were compared using a *t*-test, the result was significant at the .01 level. We can conclude from this result that the children in the experimental schools made significantly better gains than the children in the control schools. The fact that the results were significant on the Concept Inventory

and not on the Pre-School Inventory can be attributed to the fact that the matching of the schools on the pretest was better in the case of the Concept Inventory.

Because of the problem with the initial matching on the Pre-School Inventory, a ranking statistic was applied to the results on both tests so that the pairing of the schools was ignored. In this case the results on the Pre-School Inventory were significant at the .001 level and on the Concept Inventory at the .02 level. Thus, on both tests a significant number of children in the experimental group went up in rank in relation to the children in the control group. Whereas the results on the Pre-School Inventory were not significant when the mean gains of the paired schools were considered, when each child was considered individually the results were highly significant.

Since the mean gains from pretest to posttest were significantly better in the experimental schools than in their matched control schools and since a significant number of the children in the experimental group went up in rank in relation to the children in the control group on both the Pre-School Inventory and the Concept Inventory, we can conclude that the children in the experimental program did significantly better on the two tests than the children in the control schools. To the extent that concept acquisition is measured by the Pre-School Inventory and Concept Inventory, we can conclude that the children in the experimental program learned significantly more concepts than the children in the control program in a six week period. To the extent that the concepts measured by the two tests are necessary for success in school, we can conclude that the children in the experimental program were better prepared to succeed in kindergarten than the children in the control program.

This study is of relevance in considering a curriculum for Headstart programs. In the program in Canton it was demonstrated that children in centers with a highly structured curriculum can make significant cognitive gains over children in centers with a less structured curriculum. If it is conceded that the acquisition of the concepts measured by the Pre-School Inventory and Concept Inventory is necessary for success in school and that in the short time provided in a summer Headstart program, the acquisition of these concepts is the most important thing to be accomplished, then this study would lead to the conclusion that these concepts can be taught most efficiently in the curriculum used in the experimental program. It should be emphasized that in the experimental program only the educational program differed from the recommendations for Headstart. Programs affecting health and nutrition and social and psychological services were included. The children in the experimental schools also took two field trips in the six week period. The parent programs were all active and in two of the experimental schools an academic parent program was developed to accompany the curriculum followed by the children. It should be noted, however, that the results of the study do not lead to the conclusion that the children in the experimental program were better prepared for success in school than the children in the control program. To claim that the gains made in the six week period did not disappear would require a follow-up study and this was not attempted. This study can claim only that in a short-term program significant cognitive gains can be made.

B. Testing

Since the testers were kindergarten and primary teachers, they tended to have preformed expectations of the children's performance which militated against the objectivity of the testing. This was most apparent

in Part II of the Concept Inventory where the children are asked to repeat a statement given them by the tester. The pretest scores on this item were extremely high and several testers admitted afterwards that they had accepted any response as correct if the child made some effort to respond. This was further confirmed by retesting one of the experimental schools three weeks after the program had begun. The scores in many cases were lower than they had been on the pretest. It was decided, however, that since this school had probably not been the exception to include it in the study.

It was exptected at the beginning of the study that the seventeen testers for the pretest would also administer the posttest. However, six testers were not available for the posttest and new testers had to be substituted. There was, as a result, a lack of continuity between pretest and posttest in four of the pairs of schools.

The testing is a weak link in this study. It would have been preferable to have more objective testers, either high school teachers or college students. Also, it should have been a requirement that the same testers be available for both pretest and posttest.

C. Teachers and Training

In the teacher-training program the teachers in the experimental schools took part in lectures and discussions on the experimental curriculum and teaching methods. An important part of the training program was practice-teaching. Each teacher was asked to teach a small segment of the class each day. Her teaching was observed and was later discussed with either the Visiting Consultant or the Project Supervisor. In the questionnaire which the teachers completed at the end of the program, all eight expressed their satisfaction with the pre-training program. One suggestion was made which would be valuable in a future program. It was proposed

that one morning of the training program, children and teachers at the training center should follow the schedule of the Headstart program, so that teachers and aides would have an opportunity to observe the total program before they had to implement it themselves.

All the teachers felt that the training program was not sufficient to prepare them to implement the program and that weekly visits by the Project Supervisor were necessary. During the first two weeks of the program, each school was visited once a week. By the third week, visits to each school were somewhat less frequent. The general meeting with the Project Supervisor and the exchange of seat-work activities at the weekly teacher meeting was found to be useful by the teachers.

The Project Supervisor found that of the eight teachers, three had adapted their teaching styles to the experimental program by the first visit and required little assistance throughout the program. Two had considerable difficulty adapting and at the end of the program still seemed uncomfortable with the new approach. The three teachers who adapted most easily were elementary teachers, whereas the two who had the most difficulty were kindergarten teachers. It appeared that teachers with a kindergarten orientation had more difficulty adapting their style to the highly structured program than teachers oriented to elementary school teaching.

From the Canton program, it would appear that one week is sufficient time to prepare teachers for the experimental curriculum provided that periodic visits are made to the school to observe and assist the teacher. A few teachers seem able to dispense with the weekly visits, and a few appear to need more assistance than could be provided in the Canton program. A future program using an academically oriented curriculum might also consider hiring teachers who have had experience and training in elementary school teaching rather than in kindergarten.

One of the keys to the program's being implemented successfully in a particular school was the aide. It was the aide's duty to teach arithmetic and to integrate what the teacher was presenting in the language program into the other activities. The aide received instructions on seat-work activities every morning from the teacher. It was decided to have the aides teach arithmetic because it requires less training and because the aide could see the relevance of it to school learning more readily than in the case of the language program. The aides were given the high ability group in most of the schools because it was felt that the experienced teacher might be better able to contend with the learning-problems of the low ability group. All but one of the aides were enthusiastic about the academic program and their role in it, and several emerged as highly competent teachers with very little training.

It can be concluded from this study that aides can be used effectively in academic roles and that future programs might consider hiring neighborhood women to teach provided that women with a genuine interest in education are chosen and that adequate training is provided for them.

D. Curriculum: Experimental Schools

In the questionnaire all of the teachers expressed their satisfaction with the teaching program. A few stated that they would have preferred to include some more traditional kindergarten activities but in the time available they could not see how they could be integrated into the program. Only one teacher felt that the lack of emphasis on social and emotional adjustment was a deficiency of the program. This teacher had been trained to teach kindergarten and was one who had difficulty adapting her approach to the experimental curriculum. Another stated that it was the

first time in her teaching career that she had not had to consider discipline and attributed this to the tightness of the curriculum. The parents in the experimental parent program were also strongly in favor of the academic curriculum and requested that it be continued into the regular school session.

In the summer program it was decided not to use the reading curriculum from the Bereiter-Engelmann Program because of the difficulty of training teachers and because the children would not begin a formal reading program until first grade. However, some oral preparation for reading would have been a desirable addition to the curriculum and could easily have been included had it been decided beforehand to make it a part of the teacher-training and the scheduled activities.

E. Parent Program

The experimental parent program was held in two schools and was judged by attendance to be more successful in one school than in the other. In one school the teacher recruited eight parents by telling them that they had been chosen to participate in a special program. Attendance in this program was 100% for all five parent meetings. In the other school the teacher asked all the parents to attend the first meeting. The eight who attended were then asked to participate in the special program. Attendance in this school was much more casual.

All the parents who did attend regularly were enthusiastic about the academic parent program and requested that this type of program be continued in the regular school session. They stated that they preferred meeting with the teacher in small groups rather than in a one to one situation either at home or in the school. The parents also appreciated

knowing what their children were learning in school so that they could encourage and help them at home. Several parents expressed interest in an adult program in elementary school subjects to prepare parents to assist their children in school work.

Some plans were made at the end of the summer to continue the parent program in the two schools where it was begun and perhaps expand it to other schools. The possibility of hiring women to co-ordinate small parent groups and to arrange for them to meet with the teacher was also discussed.

VI CONCLUSIONS

Reidford and Berzonsky concluded that because of the short time available, it did not seem likely that children in an academic summer Headstart program would achieve significant cognitive gains over children who did not attend Headstart. The present study leads to quite different conclusions. The children in the academically oriented program made significant cognitive gains, not over a non-treatment control, but over control children who attended a less structured program. These gains were also achieved in a shorter period of time than in the Reidford-Berzonsky study, a six week rather than an eight week program. The difference in the results of the two studies can be attributed to the differences in the teacher-training programs and in the conduct of the testing. However, while we have demonstrated that significant cognitive gains can be made in a six week period, we would agree with Reidford and Berzonsky's basic contention that a year long program would more adequately prepare children to succeed in school than a six or eight week summer program.

This study has not been an answer to the challenge posed by Wolff and Stein. To demonstrate that the gains made in the six week academic program did not 'wash out' once the children had begun school or even that the academic program more adequately prepared children for academic success in the regular school session, would require a follow-up study and this has not been attempted.

The Canton study has demonstrated that in a six week summer Headstart program children can make greater cognitive gains if they are exposed to a highly structured academic curriculum than if they are exposed to a less structured curriculum and that the children in such a program can receive the benefits of the health, social, psychological, nutrition and

parent programs recommended by Headstart. The study hopes to raise one important question. Since it is the prime concern of Headstart to prepare children from disadvantaged home environments to succeed in school and since it has been demonstrated by Karnes and DiLorenzo that intensive academic programs on a long-term basis do prepare children for academic success, and since, as this study has pointed out, it is possible to implement an intensive academic program on a short-term basis and achieve cognitive gains, must not the educational program recommended by Headstart and offered in the majority of Headstart centers be reconsidered?

VII SUMMARY

The purpose of the study conducted in Canton, Ohio, in the summer of 1967, was to determine whether in a six week summer Headstart program children following an academically oriented curriculum can make significant cognitive gains over children following a less structured curriculum. Of the seventeen Headstart centers, each with approximately fifteen children, eight were designated as experimental and were matched according to socioeconomic level with eight control schools. One control school was not matched. The children were pretested in the first two days of the program and posttested in the last two days on the Pre-School Inventory and Concept Inventory. A *t*-test was applied to the mean difference in gain from pretest to posttest between the matched experimental and control schools. On the Pre-School Inventory the results approached significance at the .10 level (df=7). On the Concept Inventory the results were significant beyond the .01 level (df=7). A Pearson product-moment correlation and a *t*-test applied to the pretest results indicated that the matching of the schools was better for the Concept Inventory than for the Pre-School Inventory. It was, therefore, decided to carry out an analysis ignoring the pairing of groups and using the individual child as the unit of sampling. For this purpose a ranking statistic was employed. A Wilcoxen Test for Two Matched Samples applied to the results of the ranking indicated that the results were significant at the .001 level on the Pre-School Inventory and at the .02 level on the Concept Inventory. On both tests a significant number of children in the experimental group went up in rank in relation to the children in the control group.

From these results it was concluded that children in a six week summer Headstart program using an academically oriented curriculum can make significant cognitive gains over children in a program with a less structured curriculum while still receiving the benefit of the health, social, psychological, nutrition, parent programs and field trips recommended for Headstart.

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